C.U. SHAH UNIVERSITY Summer Examination-2020

Subject Name: Power System Protection Subject Code: 4TE07PSP1 Semester : 7 Date : 03/03/2020

Branch: B.Tech (Electrical) Time : 10:30 To 01:30

Marks :70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
- (2) Instructions written on main answer book are strictly to be obeyed.
- (3) Draw neat diagrams and figures (if necessary) at right places.
- (4) Assume suitable data if needed.

Q-1

Attempt the following questions:

- Define the term: Time Setting multiplier 1)
- Define the term: Plug setting multiplier 2)
- 3) Give only the types of relay test.
- Give the types of test performed on current transformer (CT). 4)
- Draw inverse, very inverse and extremely inverse characterisitcs for overcurrent 5) relay.
- 6) The electromagnetic relay operation occurs when operating torque becomes greater than restraining torque. Determine whether the given statement is TRUE or FALSE.
- Which type of relay is used for overload protection in an induction motor? 7)
- 8) The relay used for the feeder protection is:
 - (a) Under-voltage relay
 - (b) Translay relay
 - (c) Thermal relay
 - (d) Buchholz relay
- 9) _____ relay is a gas operated relay.
- In (unit/nonunit) protection, relay operates only for internal faults 10)
- Which component ensures the safety of the line from damage? 11)
 - (a) Relay
 - (b) Circuit breaker
 - (c) Bus bar
 - (d) Current transformer
- 12) If a relay operates for a fault beyond its protected distance, relay is said to be_____ (overreach/underreach).
- 13) In a breaker back up protection, different breakers are provided for main and back up protection. Determine whether the given statement is TRUE or FALSE.
- 14) Give the name of different types of unsymmetrical faults.

Attempt any four questions from Q-2 to Q-8

Q-2 **Attempt all questions** (14) Discuss the essential qualities of a protection system. 07 a) Draw the basic connection of Trip circuit and explain how it works. b) 07



(14)

Q-3		Attempt all questions	(14)
	a)	What is the function of impedance relay? Explain operating principle and characteristics of impedance relay.	07
	b)	Draw and explain the principle of circulating current Differential (MERZ-PRIZE) protection.	07
Q-4		Attempt all questions	(14)
	a)	Draw the vector diagram of current transformer (CT). With the help of vector diagram explain what current ratio error is?	07
	b)	Calculate the VA output required for a C.T. of 5 A rated secondary current when burden consists of relay requiring 10 VA at 5 A plus loop lead resistance of 0.2 Ω .	07
Q-5		Attempt all questions	(14)
	a)	Write types of faults encountered in transformers and explain percentage differential protection of transformer.	07
	b)	Explain how an induction motor is protected from single phasing.	07
Q-6		Attempt all questions	(14)
	a)	What is necessity of protecting electrical equipment against traveling waves?	07
	b)	Give the types of test performed on relays. Explain primary and secondary current injection test.	07
Q-7		Attempt all questions	(14)
	a)	Give any seven advantages of static relay over electromagnetic relays.	07
	b)	Draw the schematic diagram of carrier current protection and explain the function of each equipment.	07
Q-8		Attempt all questions	(14)
	a)	What is Peterson coil? What protective functions are performed by this device?	07
	b)	Explain the theory of core balance current transformer for earth fault protection.	07

Explain the theory of core balance current transformer for earth fault protection. b)

